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THE PATHOGENESIS OF PTERYGIUM.[1]

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Although the question of how best to treat pterygium has, from time to time, received considerable attention, but little effort seems to have been made to throw light upon the mode of origin of this by no means uncommon affection. Having had occasion recently, in preparing an article upon pterygium for the forthcoming volume of Wood's Hand-book of the Medical Sciences, to examine the several theories which have been proposed regarding its pathogenesis, I could not but be impressed with the inadequacy of each of them.

It is manifest that any theory which would satisfactorily explain the origin of pterygium must not lose sight of, indeed must account for, the fact that this growth rarely, if ever, makes its appearance except directly over one of the recti muscles and, besides, that it is not found with equal frequency over each of

[1] A paper read before the American Ophthalmological Society, July 21, 1887.

these muscles, but in a very large majority of cases is in relationship with the rectus internus. This, however, the theories heretofore advanced fail to do. Take, for example, Arlt's theory, which has been very generally accepted, that pterygium has its starting point in an adhesion between swollen conjunctiva and a marginal corneal ulcer. It is manifest that, if this were the usual method of its production, since marginal ulcers of the cornea are not appreciably more frequent in one direction than in another, we should find pterygia approaching the cornea from every possible direction, and certainly bearing no constant relationship to the position of the recti muscles. The more recently proposed theory of Poncet, that pterygium is a parasitic disease, and that its advance upon the cornea is due to the presence of microbia—parasitic "vibriones" (*sic*)—which are supposed to tunnel their way beneath the corneal epithelium, is, of course, open to the same objection. Moreover, it is to be remarked that pterygium does not, as a rule, begin to form exactly at the corneal margin; but, on the contrary, that it frequently attains considerable size before its apex has even reached this point and, therefore, before the ulcerative process (which Arlt and Poncet agree in regarding as the starting point of the affection) could possibly have played any part in its formation. Such being the case, it is evident that we must seek elsewhere for the primary cause of pterygium than in diseased conditions of the cornea.

It has long been taught that the development of pterygium is favored by conditions which produce persistent hyperæmia of the conjunctiva, as, for example, when the eyes are exposed to the heat of a tropical sun, especially as in long sea voyages, or to the heat from furnaces, as is the case with stokers and founders, or to the irritant action of dust and vapors, as in certain manufacturing establishments; and the evidence in favor of this view is much too strong to be put aside. It is certain, however, that it frequently occurs without the eyes having been subjected to such unusual conditions; and, moreover, though this explanation of the origin of pterygium might account for its

seldom making its appearance above or below the cornea, since in these situations the conjunctiva is more completely protected by the lids from external irritants, it would not account for its occurring so much oftener upon its nasal than upon its temporal border. Assuming, however, that persistent hyperæmia of the conjunctiva is an important factor in the production of pterygium, are there reasons why this condition should occur especially to the nasal side of the cornea—where pterygium usually makes its appearance?

Although the constant relationship between the location of pterygium and the position of the recti muscles, to which reference has been made, would seem to suggest that there is some connection between the two, I am not aware that this idea has been advanced heretofore. It seems to me highly probable, however, in view of the intimate connection between the vascular system of the recti mucles and that of the conjunctiva in the neighborhood of the corneal border (anterior conjunctival vessels of Van Woerden) that these muscles, by influencing the blood supply of the over lying conjunctiva, do, in fact, play a most important role in determining the formation of the pterygium. Supposing that such is the case—that the determination of blood to the recti muscles tends to promote a hyperæmic condition of the over-lying conjunctiva, and that this, in turn, leads to the development of pterygium—it is manifest that of all the straight muscles the interni would exert by far the most decided influence in this respect, for they are not only the largest and the most active, but they lie in closer relationship with the conjunctiva than any of the others, since their attachment to the sclerotic is nearer to the corneal border. Thus we have at once a satisfactory explanation of the fact that pterygium occurs in so large a majority of cases to the nasal side of the cornea.

In support of this view of the causation of pterygium, I may mention, as a matter of observation, that persons who suffer with this affection not infrequently complain that the pterygium itself and the conjunctiva in its neighborhood become blood-shot when the eyes are much used in near work.

What the especial conditions are which bring about this state of localized hyperæmia of the conjunctiva in some eyes, rather than in others, remains to be shown. In some instances it is, perhaps, due to peculiarities in the distribution of the blood-vessels of the muscles and conjunctiva; but in a greater number I am inclined to think it is dependent upon conditions which disturb the normal relationship between accomodation and convergence, and thus render binocular vision difficult, such as insufficiency of the internal recti muscles and the several varieties of ametropia. I must confess, however, that as my attention has only recently been directed to this point, I have as yet but little clinical evidence to offer in support of it.

ANTIPYRINE AS AN ANALGESIC IN INFLAMMATIONS OF THE EYE.

BY M. H. POST, M.D., ST. LOUIS.

April 11, 1887, Mr. —— consulted me with a severe double iritis; he had been under the care of a physician before I saw him, but as both pupils were small and bound by numerous posterior synechiæ, and as no applications but cocaine had been made I presume the case had been mistaken for one of neuralgia.

I at once began treating the case energetically with mercury and atropia, with excellent results. The pain, however, continued to increase till finally, having exhausted my other resources I was about to prescribe morphine, when his wife informed me that he could not bear it. "But," she added, "the antipyrine relieved his pain."

Upon inquiry I found that antipyrine had been prescribed by my predecessor, and as the patient still had a powder of 25 grains I told him to take it that night when the pain came on. The next morning he reported that he had passed a very comfortable night. And the appearance of the eye was improved. To satisfy myself of the virtue of the drug, one night I had it omitted, and the pain returned. The case made an excellent and rapid recovery.

Since that time the drug has become a regular part of my treatment of iritis. I have used it in specific and non-specific cases, and thus far it has never disappointed me. I have also used it in pain resulting from ulceration of the cornea, and slowly progressing panophthalmitis, and in these cases, too, it has relieved the pain.

I believe that it also modifies the course of iritis beneficially. Certainly the cases which I have treated in this way have run a shorter course than those I treated under the old method.

My plan is when the patient begins to complain of pain to prescribe ℥i of antipyrine divided into three or four powders, as I think the severity of the case indicates, with directions to take one powder every two hours till the pain is relieved. I have had cases where the 60 grains were taken in one night; but usually from 15 to 45 grains are sufficient.

TRANSLATION.

We find in the July number of the *Centralblatt fuer praktische Augenheilkunde* the following article by Prof. Jacobson (Koenigsberg).

An Operation for Trichiasis.—The little operation which is here to be described, has been performed more than a hundred times, partly by myself, partly by my assistants, in the polyclinic, Drs. Vossius and Ulrich.

The number of these operations grew rapidly with the increase of the knowledge in what cases it was indicated. The results have been good without exception, incomparably better than those of the method of Jaesche-Arlt. In the hope of making my colleagues acquainted with an operative procedure, with the results of which they will be satisfied, I present the method of operating before going into a more elaborate discussion of it.

Let us assume that there is trichiasis along the left upper eyelid. The operator stands in front of, the assistant behind the patient. The right hand of the assistant directs the horn-spatula of Jaeger, with his left hand he drops during the whole of the operation from a piece of absorbent cotton a solution of boracic acid (of 4%) or of corrosive sublimate (1-2,500) over the wound-surface. The temperature of 35° to 40° Cels., is increased to 50°, if the flap gets very pale.

First step.—Inter-marginal section according to Jaesche-Arlt (more properly according to Aëtius and Paulus, of Ægina) which splits the lid into a lower (tarsal tissue and conjunctiva) and an upper layer (all the soft parts), and which reaches about from 6 to 8 mm. upwards.

Second step.—Delineation with the knife of a thin skin-flapl beginning usually from the temporal end of the inter-margina,

section and running nearly vertically upward or downward on the skin of the face, or at an obtuse angle on the skin of the temple, or on the skin of the lid (Vossius). After the skin-flap has been loosened to within about 4 mm. from its point, a fine curved needle armed with a silk thread is passed through it from its cutaneous surface, and then the point also is loosened.

Third step.—The flap by means of the silk thread is carefully brought into the inter-marginal section, and its point is stitched to the nasal angle of the latter. The same needle fastens the upper margin of the flap at three points to the ciliary border, a stronger needle the lower margin to the edge of the tarsal tissue. The wound left by removing the skin-flap is stitched (iodoform).

Remarks concerning the first step.—Where the trichiasis is partial only, the inter-marginal section must go beyond the misplaced cilia about 3 or 4 mm. on each side. In the middle portion of the lid, the skin of the lid alone is available (perhaps it would be in all cases preferable). When the trichiasis is a total one, the first visible orifice of a Meibomian gland (?Translator) gives the point for the introduction of the knife, from which it is carried to both sides, the sharp edge of the blade slightly directed towards the tarsal tissue, in order to split the lid.

In the second step shifting of the flap, folding or pressure with the forceps must be avoided as much as possible. In the selection of the skin fine, pale hair must not be overlooked, which may be troublesome at the lower margin and may make it necessary later on (say from 6 to 8 weeks) to remove a piece from the transplanted flaps.

In the third act the operator begins by giving the free margin of the lid and the cilia the proper position (by traction on the skin), in which the assistant is to hold them. If the skin-flap shows the least tension, its basis is undermined until all tension has disappeared. During the application of the sutures the assistant must keep the surface of the flap smooth by stroking it with a small probe or rubber spatula.

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a binocular bandage (bor-lint, rubber-paper, absorbent cotton saturated with boracic acid, and bandage) in order to secure the flap in position and to take out the stitches. A suppuration in the canal of the suture, or a superficial gangrene of a part of the skin are usually of no importance whatever with regard to the result. On the third day we take the bandage off from the healthy eye, on the ninth day from the one that has been operated upon. But we have even seen a healing in the course of forty-eight hours.

The general rules of surgery must guide one with regard to the dimensions of the flap. The height depends on the breadth of the inter-marginal section (about 26 to 30 mm. height of flap), its breadth from the width of the inter-marginal portion and the position of the cilia. With regard to the former we expect a cosmetic, with regard to the latter a therapeutic effect. It is, therefore, better if the flap is a little too broad, which will hardly be perceived in the upper lid and can, if necessary, be easily corrected by an excision.

Right after the operation the cilia are in a correct position. On the next day a new formed substance is found to fill the small space between the wound-surfaces of the two layers of the lid and the inner side of the skin-flap. This new interposed tissue would not allow the margin of the ciliary portion to approach the margin of the tarsal portion, even if the flap should have sloughed (whish would be impossible in twenty-four hours). The position of the cilia, therefore, is not dependent on the healing of the flap. After a few weeks this interposed tissue has become a bloodless, firm substance, very much like the tarsal tissue, from which, if the flap should be too broad, wedge-shaped pieces may be removed. This firm substance does not contract any further.

As an operation for trichiasis this method differs from the older operations with so-called transplantation of a flap (1) by the fact that it does not dislocate the cilia, which formerly grew backward, upward or downward, but forces them forward; (2) by not exposing the ciliary border, which the operation is meant to preserve, but a simple piece of skin, to the doubtful risks of a transplantation.

This method, moreover, replaces the inter-marginal portion of the lid, whether this was lost by atrophy in consequence of marginal blepharitis, or in the latter stages of a follicular conjunctivitis. It is a common error which we meet with frequently in literature, that the usual companion of trachomatous trichiasis, viz.. entropion, is *primo loco* due to the shrinking of the conjunctiva, while in reality it depends solely, or, at least, in the main on the pressure of the orbicularis muscle. This is the reason why the healing of certain forms of entropion after operations for trichiasis could not be explained. By interposing a substance between the tarsal tissue and the muscle, it is possible to prevent entropion as well as trichiasis.

May the shrinking of the conjunctiva be ever so far progressed, or progressing ever so rapidly, no entropion will be formed, if the muscle cannot act upon the lid-margin. The extent of this action of the muscle may be easily estimated by directing the lids to be forcibly closed after the operation.

Further indications for this operation are given by the symptoms preceding trichiasis and by the chronic inflammations of the ciliary margin, which are more fraught with danger to the eyelashes the more resistance the tarsal tissue opposes to the firmly infiltrated and inflamed tissue.

The following review of Camillo Gallenga's paper on: *Contributions to the study of the infective superficial keratitis* (Journal of the Royal Italian Academy of Medicine, 1887) is translated from *Zehender's klin. Monatsblätter fuer Augenheilkunde.*

We have on a former occasion reported the experiments made by Gifford concerning the micrococci found in the conjunctival sac in cases of phlyctænular conjunctivitis. The result of these experiments was that in the normal conjunctiva very frequently (12 times in 25 cases) pathogenic cocci may be found. They are, however, considerably more numerous in an eczematous conjunctiva. Gifford did not succeed in producing phlyctænulæ in the conjunctiva of rabbits by introducing these micro-organisms into it, and he thought it impossible to take the substance for inoculation in a pure state from the phlyctænular vesicles.

Meanwhile, Burchard in Berlin succeeded in isolating from the contents of the conjunctival phlyctænulæ a very minute micrococcus, which liquifies gelatine slowly, forms colonies of a light yellow color and looks very much like the *micrococcus flavescens desidens* (Fluegge).

Gallenga, the author of the paper under consideration, also studied more closely the contents of conjunctival and corneal phlyctænulæ. He found in them two kinds of micrococci the smaller of which is pathogenic. By wounding the cornea or its epithelium in animals in the slightest manner with these cocci a profuse secretion from the conjunctiva may be started, which however, in itself, is inactive. Yet, twenty-four hours later a small nodular diffuse infiltration is seen to appear on the cornea or the conjunctiva.

This superficial infiltration grows considerably in extent, if the culture has been diluted with sterilized water and been injected under the conjunctiva. Where the cornea or conjunctiva are intact, the micrococci remain inactive.

These experiments were made in order to show the pathogenic property of the micrococci found in the contents of the phlyctænular pustules. However, the different forms of kerato-conjunctivitis are often complicated by peculiar inflammations of the cilia. In the sheath of their roots a great many leucocytes are found mixed with an immense quantity of differently arranged micrococci which are a little larger than the staphylococcus. Although these micrococci are not at all unlike those found on the normal cilia, they are easily distinguished from them.

The author thinks that we have a right to assume that a micrococcus exists in the sheath of the root of diseased cilia, which is larger, but less active than the staphylococcus and which at the same time appears to be able to produce those forms of superficial keratitis which we so frequently meet with in sickly children. The author has taken the material for his investigations exclusively from such children.

The following interesting communication is taken from the *Centralblatt fuer prakt. Augenheilkunde. On scotomata accompanying glaucomatous affections of the optic nerve.* By Dr. Theo. Sach.

During the last two years our knowledge of the functional symptoms of the glaucomatous affections has been enlarged by the publications of Bunge and Pflueger. They both concern island-like defects partly in, partly near the centre of a visual field which may be normal or contracted.

Bunge found a paracentral scotoma in four cases out of one hundred visual fields of glaucomatous eyes. He draws two of these as hooked-shaped defects, which encircle the centre of the visual field from above and from in- and downward, reach to the blind spot or come at least very near to it with their lateral end. Of the other two he says that they were similar to those drawn, but that within them the function was not totally abolished.

The scotomata described by Pflueger differ materially from those of Bunge. They were not constant in their existence nor invariable in their form. He calls one of these scotomata "centrally hemianopic," but he states at the same time that it is in no way like the scotomata found in amblyopia from intoxication. Of two further scotomata he simply says that they were paracentral. Of the fourth one he gives no details at all.

On April, 1885, before being acquainted with Bunge's paper, I found the first scotoma in a glaucomatous eye. Since then I paid especial attention to this point, whenever I made a perimetrical examination in similar cases. Thus I found among twenty-seven visual fields of glaucomatous eyes (fifteen of these had glaucoma simplex), five which had scotomata. I acknowledge that it may be a pure accident that I found so many scotomata in such a small series of cases of glaucoma; yet, I am inclined, with Bunge, to think that such scotomata are not so very rare. This, I think, we will find to be so, when we have accustomed ourselves to examine every visual field of a glaucomatous eye especially in this direction.

Aside from the probable frequency of these scotomata, they

are of great practical importance on account of the peculiar form of visual disturbance which they produce, and by the way in which they are affected by the therapeutical agents in glaucoma. Yet they are of still higher interest in considering the theory of the glaucomatous affections of the optic nerve.

Here follow the descriptions of the five cases alluded to. After calling attention to some peculiar symptoms in some of these cases, the author sums up in the following manner:

Considering these circumstances it appears to be absolutely impossible to accuse the increase of the intra-ocular tension of in any way producing these scotomata.

Although agreeing in this with Pflueger I cannot accept for my cases the explanation given by this author for his cases, in which the scotomata were strangely unstable. Pflueger is inclined to explain the scotomata by an affection of the rods and cones of the retina, while the nerve fibres are intact. It is not probable that such an affection of the neuro-epithelial layer, which, according to the extent of the defect, would have to concern an area of the retina of many times the size of the optic disc, and which must according to the intensity of the functional disturbance, cause a very considerable and material altreation, should remain invisible to the ophthalmoscopist. As long as it is, it is merely a hypothesis.

The only and constant anatomical alteration found in the fundus of such eyes affected with scotoma was the excavation of the optic nerve and these peculiar defects of the visual field are undoubtedly due to this excavation, or rather to what in turn produces it.

Jaeger has assumed a peculiar disease of the optic nerve in order to give an anatomical basis for the excavation of the optic disc observed without being due to an increase of the intra-ocular pressure, and Schnabel has proven its existence beyond a doubt (? Translator) by theoretical reasoning and by a series of clinical observations.

We are in general accustomed to see scotomata in cases of disease of the optic nerve. Why then should we be astonished when finding them in eyes affected with a glaucomatous disease of the optic nerve?

Moreover, the scotomata which I observed in glaucomatous eyes show very remarkable analogies especially with the scotomata found in cases of amblyopia from intoxication. The extent of the scotomata above described in a horizontal direction corresponds without an exception with a portion of the scotoma from intoxication, in which, as Bunge and I have elsewhere shown, the conducting elements show the most pronounced anatomical changes. If we succeed in showing that in glaucomatous eyes the site of the intense functional trouble corresponds to the same portion of the visual field, it proves that optic nerve fibres which enter the retina laterally to from 2° to 3° from the macula lutea are most prone to lose their function under the influence of anatomically different affections. The explanation for such a predisposition is, of course, at present wanting.

THE AMERICAN OPHTHALMOLOGICAL SOCIETY. TWENTY-THIRD ANNUAL MEETING.

[CONCLUDED.]

THURSDAY.—MORNING SESSION.

Case of Glioma of the Retina. By H. D. Noyes, M. D., of New York.

The patient, a child, was first seen when fifteen months old. The eye was enucleated, and microscopical examination confirmed the diagnosis of glioma, which was made prior to operation. The patient was again seen 14½ years later, when 16 years of age. An artificial eye had been worn. There was not the slightest evidence of a return of the disease.

Pseudo-glioma. This case was reported on account of the interest connected with the diagnosis. It was difficult to say positively whether or not there was an intra-ocular tumor. The case was examined by Dr. H. Knapp and the author, and a diagnosis of inflammatory trouble was made. Enucleation was advised on account of the doubt as to the correctness of the diagnosis, and even if the affection were purely inflammatory, enucleation was the wisest plan in view of future possibilities. The patient was a boy, aged five years, who in November, 1886, had fallen from his velocipede, the handle of the machine causing a wound of the left cheek under the orbit. There was no apparent injury to the eye, and during the following winter there was no trouble. On May 4, 1887, he was first seen by the author. There was at this time a cicatrix one inch below the border of the left orbit. No irregularity of the orbital edge could be detected and pressure on the globe caused no pain. The movements of the eye were normal and the pupil active. The iris had a slightly greenish hue. An extremely vascular growth was seen with ease. This appeared

to fill the fundus. After consultation it was deemed advisable to enucleate the eye. This was done, the wound healing promptly. Examination showed that there had been cyclitis with inflammation of the vitreous with the production of a mass of inflammatory tissue extending across the eye behind the lens, forming a perfect septum. The retina was totally detached and the choroid was partially detached. There was also marked hypertrophy of the tissues at the base of the orbit. It was thought that the original process had been an injury to the floor of the orbit.

Prolapse of the Lachrymal Gland. Dr. Noyes also reported the case of C. S., aged 20 years, who consulted him on account of a swelling in the upper lid of the right eye. This had been growing for nine years. It could be freely moved over the globe and moved with the movements of the eyeball. There was no history of injury or of inflammation of the eye. The mass was removed and found to be a displaced lachrymal gland. The removal has been followed by no unpleasant effects. Four cases of displacement of the lachrymal gland are on record.

Operation for the Relief of Entropion of the Lower Eyelid. While in theory the operations for the relief of this condition are very simple, yet in practice they often fail to accomplish the desired end. The author described an expedient which he had employed four years ago. He excised a piece of skin below the border of the lid and then dissected up a flap, leaving an open wound. He next freshened a spot on the outer border of the lower lid, taking out a piece of conjunctiva. He then turned the flap upward and attached it to the freshened surface. This little flap served to hold the lid in a position of eversion. In one week the stitches were removed. The patient then disappeared and was not seen for four years. It was then found that the lid remained in a natural position. The little bridge of skin still was present and under it there was a sinus through which a probe could be passed. The piece of skin was divided and the result was perfect.

DISCUSSION.

Dr. Samuel Theobald, of Baltimore, mentioned in connection with the case of glioma one that had gone nine and one-half years without a return. The only weak point in the case was that no microscopical examination had been made. The macroscopical appearances were, however, characteristic. The operation was done when the boy was 6 years of age. The boy is still perfectly well and there is no suggestion of the return of the disease.

Dr. H. Knapp, of New York, said that until lately he had held the view that there was such a thing as the permanent cure of glioma, but now he was doubtful if this is ever accomplished. There are exceptional cases which do not terminate fatally until ten or fourteen years after operation. They then die from a return of the local disease or else from a generalization of the condition. Graefe says that all of these cases died.

Dr. J. S. Prout, of Brooklyn, had had one case of plastic exudation in the eye of a child which went on to rupture of the eyeball and the death of the patient. He believed that life might have been saved if the eyeball had been removed.

Dr. B. E. Fryer, of Kansas City, had in the diagnosis of small intra-ocular tumors derived in several instances much advantage from the use of the electric light.

Dr. H. Knapp, of New York, in the illumination of these eyes which are blind had used sunlight. The light is admitted through a hole in the shutter and thrown into the eye by a large concave mirror. This is of advantage in the diagnosis of glioma and of sarcoma where the fundus is often very dull.

Dr. Emil Gruening, of New York, had seen two cases in which there had been an apparent immunity from the return of glioma. The first case was operated on in 1875. The patient was a girl, five years of age. The optic nerve was not involved. The girl is still under observation and in perfect health. The second case, a child one year old, was operated on May, 1880. It was a case of true glioma with no involve-

ment of the optic nerve. The child is still perfectly healthy. Both of these patients have been wearing artificial eyes since the operation.

Dr. John Green, of St. Louis, had found most of the operations for entropion of the lower lid unsatisfactory. He had in a general way followed Panas' recommendation of making an incision below and bringing the lid down by the use of sutures. He had extended this operation by the following procedure: After inserting the sutures he makes a cut a little inside of the border of the lid carrying it through the whole thickness of the tarsal fibrous tissue. When this is done the sutures are much more effective and there is no tendency for cicatricial contraction to occur in the process of healing. The results obtained by this method have been eminently more satisfactory than those obtained by any other procedure.

Dr. Emil Gruening, of New York, in the treatment of entropion of the lower lid had employed the method of Hotz, but had passed the sutures through the whole thickness, not only through the orbital tarsal aponeurosis, but also through the conjunctiva. He now has under observation six cases which have been operated on during the past six years and the result has been satisfactory.

A Phenomenal Pulsation of the Interior of the Eye. By Dr. W. F. Mittendorf, of New York.

The patient, 15 years of age, came under observation for asthenopic trouble. He showed no signs of disease. The tension of the eye was normal and the fundus was normal. There was no pulsation of the arteries or veins, but pulsation could be induced by pressure. A short distance above the disk there was a grayish-white band stretching from one vein to another and looking like a little sac filled with fluid. In the middle this band presented a little point. This band further showed distinct pulsation which corresponded with the cardiac pulsation. The patient was seen a number of times and the appearance was always the same. A little higher up and more to the nasal side, there was a similar band connected with

an artery. This did not pulsate except when pressure was made. It was thought that the band was composed of connective tissue which was thrown into vibration by the meeting of the vibration of the two veins with which it was connected.

DISCUSSION.

Dr. Edward Jackson, of Philadelphia, recently saw in a case that presented no spontaneous pulsation a little band extending from the peri-vascular sheath which was thrown into vibration with each radial pulsation. This condition occurred in both eyes.

Increase of Blindness in the United States. By Lucien Howe, M. D., Buffalo.

Attention was called to the fact, that while the population during the ten years from 1870 to 1880 increased at the rate of 30 per cent., blindness during the same time increased over 140 per cent. By means of a diagram this percentage of increase in each state separately was shown. The statistics also show that blindness increased in an almost constant ratio from North to South in the United States, and that it decreased in the same way from East to West. This was also shown by colored maps. The cost of sustaining this army of over fifty thousand blind was estimated on the lowest basis of cost, and of wages which would have been earned, at over sixteen million dollars in 1880, or over twenty-five million in 1887. As for the causes, contagion was found to exercise the most important influence. This was found by a special examination made for the purpose of 128 pupils at the Batavia asylum for the blind, by the statistics collected by Magnus and by the record of over forty-eight thousand cases treated at the Manhattan Eye and Ear Hospital. Immigration was also considered as an important factor in view of the large number of contagious diseases of the eye introduced every year into the country, and the laxity or absence of quarantine regulations regarding them. As for the prevention, suggestions were

offered, first, as to the care of new-born children; second, the isolation of suspicious cases in residential schools and other institutions, even for adults also; third, the instruction of the public as to the advisability of guarding against contagious forms of disease.

Finally, it was advised that the entire matter be referred to a committee to examine again the statistics and report more complete methods for the prevention of blindness.

DISCUSSION.

Dr. Swan M. Burnett, of Washington, had been much interested in the statistics of Dr. Howe, particularly in those with reference to the greater percentage of blindness in the Southern portions of the United States as compared with the middle and more Northern portions. This brings up the important question of the influence of race. The larger part of the population of the South is, of course, negroes, and the larger part of the blindness must be among that race. It had been his experience that negroes do not suffer to any degree from trachoma. In a study of several thousand cases of eye troubles among the negro, he had found only one genuine case of trachoma and that occurred in a mulatto. The conjunctival diseases which in other races cause a large part of the blindness must be thrown out in considering the negro. The negro, however, suffers much more from scrofulous disease of the eye, particularly of the cornea than do the white race. Negroes also suffer largely from ophthalmia neonatorum and many cases of blindness due to that cause have come under observation.

Dr. Mittendorf, of New York, was not surprised to hear that blindness in the United States is increasing. He thought that the most prolific cause of this is the over-crowding of young persons in institutions. An examination of a large institution in the neighborhood of New York has shown a large number of contagious ophthalmic cases in that institution, not known or neglected. In our large dispensaries we meet almost

weekly with persons who have become blind from neglect and from contracting diseases of this kind in such institutions. It is very difficult to get an idea of the exact number of blind persons. The great majority of blind children are not counted in these statistics. They are kept at home and provided for there. One of the most important things is to stamp out these diseases in large institutions, and the best way to do this is to prevent overcrowding. Instead of placing the children in large buildings, they should be sent to the country and placed in small numbers in cottages.

Dr. Peter A. Callan, of New York, said that the whole question turns on this, what can we do? We are very backward in that respect. In London they have a society for the Prevention of Blindness, which does good work. The spread of the disease is often due to neglect and often to the use of improper applications in ophthalmia neonatorum by the mother or the nurse. Ought we not in every state to organize societies and instruct the people what they should do and what they should not do?

Dr. Myles Standish, of Boston, had found that the most troublesome cases of trachoma and the like occur in persons who have been in the country only two or three weeks. When they arrive in the country the disease is usually at its height and they are in a condition to spread the affection among those with whom they come in contact.

In connection with this matter, Dr. Howe offered the following resolutions:

WHEREAS, The census reports indicate that there has been an increase in the number of blind in the United States, more than four times as great as that of the total population and

WHEREAS, An inquiry as to the causes of this, shows that it is largely due to contagious diseases of the eye, therefore

Resolved, That a committee of three be appointed to examine further as to this apparent increase, and recommend means for its prevention.

Resolved, That the President of the United States and the Secretary of State be respectfully requested to furnish this

committee with whatever letters or other recommendations may be necessary to further their investigations in this country or elsewhere.

Resolved, That the official in charge of residential schools and similar institutions also be requested to assist the committee to any extent in their power.

These resolutions were adopted and the President announced Dr. Lucien Howe, of Buffalo, as Chairman of the committee. The other members to be appointed subsequently.

The Eye of the Adult Imbecile. By Charles A. Oliver, M. D., Philadelphia.

Twenty young adult male imbeciles were examined, care being taken to exclude all but the proper class of subjects. Nineteen observations were obtained from which were drawn the following conclusions:

1. The eye of the male adult imbecile is an organ which is capable of proper functional activity.

2. By reason of early mental incapacity, the ordinary appearances seen in the used eyes of the mentally healthy are lessened in due proportion to the amount of work given to the organ.

3. The eye of the imbecile, being practically an unused organ for close and careful near work, the distention of the globe and the elongation in its visual axis with consequent increase in index of refraction is almost entirely avoided; this being in direct ratio to use.

4. The want of these physical changes may be considered as significant of a type of unused healthy adult human eyes.

5. The healthy eye of the imbecile serves to teach us that the various conditions seen in the used eye of the mentally healthy must be considered as pathological changes, the representatives not only of general want of tone but of constant and frequent abuse of a delicate organ.

Dr. Charles A. Oliver also exhibited water color sketches of a case of double chorio-retinitis with partial degeneration of the optic nerve, associated with curious lymph extravasation

into the retina and vitreous in a boy 12 years of age who had had an attack of basilar meningitis five years previously, at which time the eyesight became bad. No hereditary dyscrasia could be discovered. Vision was greatly reduced and patellar tendon-reflex was almost abolished.

Additional Cases of Hypertropic Refraction, Passing While Under Observation into Myopia. By S. D. Risley, M. D., Philadelphia.

Thirteen carefully studied cases in which the eyes with hypermetropic refraction had been observed to pass into myopia had been recorded in the annals of the society. To-day the author brought forward nine additional cases, making a total of twenty-two. In all these cases the state of the refraction had been repeatedly demonstrated under complete paralysis of the accommodation. In every case there was well-marked retino-choroidal irritation with asthenopia. Insufficiency of the internal rectus was noted in three cases, in all of which tenotomy of the external rectus was performed. In no case was emmetropic refraction observed at any stage of the progress. The condition seemed to pass from the shallow hypermetropic ball to the lengthened myopic eye by the turn stile of astigmatism. A detailed record of nine cases was given.

The most important measure in the treatment of these cases was considered to be the use of correcting glasses. When we consider the large number of cases which at the first present the same condition as the cases reported and who have subsequently had no return of the trouble, we cannot but think that the group of cases now presented are only those in which the treatment has failed, and that without their correcting glasses a much larger number would have pursued the same history. A study of these cases has demonstrated to the author the importance of astigmatism when present in very low degree, as a factor in setting up these changes in the nutrition of the eyeball, which result in impaired resistance to even normal intraocular tension.

The Pathogenesis of Pterygium. By Samuel Theobald, M. D., of Baltimore. (See page 207, this number.)

The generally accepted theory of Arlt that pterygium has its origin in a marginal corneal ulcer to which a tag of conjunctiva has become attached he thought was untenable, because if this were its usual mode of origin, pterygium would be found approaching the cornea from every possible direction, since marginal corneal ulcers are not apparently more frequent in one position than in another. It is known, however, that such is not the case, but that pterygium is almost always situated directly over the recti muscles, and that in a very large proportion of cases it is over the rectus internus. The more recently proposed theory of Poncet, that pterygium is due to the presence of microbes which tunnel their way under the corneal epithelium is open to the same objection, for this also assumes the existence of a precedent corneal ulcer. The view long held that conditions which tend to induce chronic hyperæmia of the conjunctiva favor the formation of pterygium he thought as well established.

Assuming that this view is correct, are there reasons why a localized hyperæmia of the conjunctiva should be of frequent occurrence where pterygium usually forms, to the nasal side of the cornea. This was answered affirmatively. The close connection between the vessels of the recti muscles and those of the anterior portion of the conjunctiva were referred to, and it was pointed out that the determination of blood to these muscles might influence the blood supply of the overlying conjunctiva and that this would be the case especially with the recti interni since they were the largest of the straight muscles and in close relationship with the conjunctiva because attached to the sclerotic nearer to the corneal border than any of the others. Abnormality in the distribution of the blood supply of the internal recti muscles and of the overlying conjunctiva, and more frequently still disturbance in the normal relationship between convergence and accommodation such as insufficiency of the internal recti muscles the different vari-

eties of ametropia. These were regarded as the usual causes of pterygium through the localized hyperæmia of the conjunctiva to which they gave rise.

Recurrent Retinal Hæmorrhages Followed by the Outgrowth of Numerous Small Blood-vessels from the Optic Disc. By Samuel Theobald, M. D., Baltimore.

The case reported was that of a lady, 52 years of age, in whom menstruation had recently ceased. During a period of nine months she had suffered with recurrent hæmorrhages into the retina and the posterior part of the vitreous humor of one eye. The macula escaped serious involvement and central vision was but little affected. The hæmorrhages were supposed to be due to thrombosis of one of the larger retinal veins. Finally, a nebulous outgrowth from the optic disc extending forward into the vitreous humor for some distance made its appearance. This consisted of numerous small and nearly parallel blood-vessels running from behind forwards and held together by semi-opaque tissue, the outline of which could be easily distinguished from the surrounding vitreous. When last seen this growth had diminished somewhat in size. The prognosis was regarded as favorable, the development of new vessels being looked upon as an effort of nature to repair the damage caused by the repeated hæmorrhages.

DISCUSSION.

Dr. W. H. Carmalt, New Haven, reported the following case: On February 17, 1877, a gentleman presented himself complaining of sudden blindness in the left eye. This was filled with blood which prevented a thorough examination. A month later examination showed nothing peculiar, except traces of coagula in the vitreous. August 3 of the same year he began to complain of affection of the other eye. On this occasion Dr. Noyes examined the eye and found hæmorrhage into the vitreous of the right eye. The condition cleared up in that eye, and on June 3, 1878, the left eye was again affected. These attacks have continued to recur every few months.

Dr. B. E. Fryer, Kansas City, asked with reference to the cases of recurrent hæmorrhages, whether or not attention had been directed to scurvy as a cause? He had seen one case of recurrent retinal hæmorrhage which he thought was due largely to that cause.

Dr. O. F. Wadsworth, of Boston, had seen several cases of recurrent hæmorrhage partly retinal, but largely into the vitreous. In only one could he positively say that there was a development of vessels into the vitreous. The other cases have not been observed sufficiently long to show whether or not there has been a development of vessels. The case referred to was that of a man seen ten years ago, when he was thirty-five years of age. There was extensive hæmorrhage into the vitreous of one eye, rendering the fundus invisible. This cleared up to a certain extent, leaving portions of the retina clear. Then certain changes in vessels toward the periphery could be seen. The other eye showed a perfectly healthy fundus, except in certain places toward the equator, where there were several patches of perivasculitis. The hæmorrhages continued to recur in the affected eye. After a time there could be detected in the vitreous a nearly transparent membrane containing vessels, some of which could be traced back to the retinal vessels. Two or three years later he again saw the patient. He had then been free from recurrences for a year or two. There were still some vessels in the vitreous, but not so many as previously.

Dr. H. Knapp, of New York, said that in the treatment of this condition the main point is not to fatigue the eyes and to put them at rest early in the evening. A waitress in a New York family suffered from hæmorrhage every time the family gave an evening party. She was sent to the country and the hæmorrhage cleared up. She returned and served at an evening party, and again the eye filled with blood. She has now given up service and for two or three months has had no trouble. The treatment consists in rest, and in avoidance of everything that would produce a dropsical condition of the blood.

Embolus of the Central Retinal Artery. By G. C. Harlan, M. D., Philadelphia.

The patient was a clerk, 52 years of age, in good general health. While reading in perfect comfort, a shadow suddenly appeared before the left eye, and on closing the other he could just distinguish large objects about the room, "through a brownish haze," and in a few minutes sight was entirely gone.

An ophthalmoscopic examination made the next morning showed an extensive œdema of the retina giving the whole fundus a grayish tinge; disc pale and its margin blurred; arteries very pale, although not much narrowed, and some of the smaller branches lost in the retinal œdema; larger veins contracted in places particularly in and near the disc, but generally of full calibre; phenomonon of visible, slow, continuous circulation of blood in bead-like sections well marked in superior temporal artery and vein; macula occupied by bright red patch, oval in form with its long diameter horizontal, and several minute terminal vessels in its neighborhood enlarged and apparently isolated; two small dots of retinal hæmorrhage at outer margin of disc. The œdema increased decidedly for the first few days and then gradually subsided. There was still a little remaining on the 19th day, after which the patient was not seen for three weeks, when the color of the fundus was normal. The visible circulation lasted only about a day and a half, disappearing first in the artery. The veins refilled at their narrowed portions and retained nearly their full calibre, while the arteries became paler and narrower until only the two main trunks could be seen, and these showed white lines along their margins from perivasculitis. The spot at the macula gradually disappeared. The disc regained the distinctness of its outlines, but remained dead white. Colored plates were shown illustrating the first and the final appearance of the fundus.

The pathology of the case was very obscure. The heart and kidneys were normal, and there was no symptom of degeneration of the arteries. A caries of the middle turbinated bone on the same side, from long standing nasal catarrh, was

not thought more likely to act as a cause than would be a similar local disease in any other part of the body.

The only possible causes seemed to be: that some product of the nasal disease might have found its way into the general circulation and lodged in the retinal artery; that an embolus might have been formed of a fragment washed from a parietal thrombus in some distant vessel; or that the obstruction might have resulted from disease in the retinal artery itself.

Chronic Glaucoma. Dr. David Coggin, of Salem, Mass., read a paper on this subject describing a case, the object being to elicit discussion as to the best method of treatment.

Danger to Iron Workers from the Use of Old Hammers. By Dr. George C. Harlan, of Philadelphia.

A hammer was shown from which a fragment had spllt off, injuring the eye of a workman. The constant concussion of the hammer causes it to assume a crystalline condition and become very brittle.

A Case of Retinitis Pigmentosa Treated Electrically. By Myles Standish, M. D., Boston.

The patient was a woman, 33 years of age, and was myopic 1.50 D. She had worn glasses since she was 17 years of age. When first seen, April 14, 1886, her sight had been failing for three years and for the last three months had failed very rapidly so that she could not go on the street alone after dark. Upon ophthalmoscopic examination characteristic patches of retinitis pigmentosa were found in the periphery of the fundus of each eye.

Her vision was right eye $^{12}/_{xl}$; left eye $^{12}/_{l}$, and the fields of vision were limited to less than 20° in the vertical and horizontal axes.

The only treatment has been the use of the constant current, of such strength as could be easily borne. This has been applied once in five days during the last fifteen months. Her present vision is right, $^{12}/_{xxx}$; left eye $^{12}/_{xv}$, and the fields of

vision have now vertical and horizontal axes of 70°. She now goes on the streets after dark with safety.

Aseptic Cataract Extraction with Irrigation. By C. H. Williams.

The author reported five cases of irrigation of the anterior chamber after cataract extraction with a ½% of chloride of sodium as recommended by Dr. McKeown. Instead of a syringe, a glass flask was used, bearing two glass tubes blown in the side. One of these was drawn out to a fine nozzle that could be easily inserted into the anterior chamber; the other had a rubber tube and mouth-piece attached so that the pressure of the stream could be controlled by the operator. The flask had a capacity of 50 cc., more than enough to complete any irrigation without removing the tube from the eye. The irrigating instruments and the 2% solution of cocaine were sterilized in the steam sterilizer and this was not found to injure the anæsthetic properties of the cocaine. The rest of the instruments and the dressings were sterilized by dry heat at a temperature of 50° Cels. In order to determine the efficiency of the solution of the biniodide of mercury used for the preliminary washing out of the conjunctival sac, some experiments with plate cultures were made at the laboratory of the Harvard Medical School, through the kindness of Dr. Ernst. An equal amount of the biniodide of mercury and the iodide of potassium were dissolved in water and added to 10% nutrient gelatine, to give a series of strengths up to 1 to 5,000 of the biniodide to the gelatine. Ten days after exposure to the air of the laboratory for six and one-half hours, no growths of bacteria were found among the plates, although on the unprotected plates exposed at the same time, there was an abundant development of colonies of bacteria. Gelatine of the strength of Panas' solution (1–20,000) was then tried, and these plates after four days showed an average of 1.5 and 0.8 colonies of bacteria to the square centimetre of surface in the two series of plates, while on the unprotected plates the average was 10.5. In two of the cases of extraction a suture was passed

through the piece of conjunctiva above, and this held the wound well in apposition. All of the extractions were done without iridectomy, and a layer of iodoform was dusted on the edge of the closed lids, just before applying the bandage.

Case of Congenital Zonular Greyish-white Opacity Around the Fovea. By O. F. Wadsworth, M. D., Boston.

The patient was a child, eleven months of age. She was unable to sit or stand, and could not hold anything in her hands. She appeared to take little notice of anything. Externally the eyes were normal. With the ophthalmoscope the discs did not seem to vary from the normal appearance. The macula was dark red and surrounded by a grayish-white opacity. The remainder of the fundus appeared to be normal. There appeared to be some light perception. Five months later there seemed to be no perception of light. The disc was sharply defined, the central vessel small. The mother had had four healthy children. The fifth, according to the history, had been sick in a similar way as the one under consideration. In all the reported cases some weakness of the general muscles was noted.

Separation of the Retina in Both Eyes with Albuminuria of Pregnancy—Replacement. By O. F. Wadsworth, M. D., Boston.

The patient was a married woman seven and one-half months pregnant. About the beginning of the eighth month œdema of the eyelid appeared. This was soon followed by indistinctness of vision. The urine was loaded with albumen and contained hyaline and granular casts. When seen by the speaker, there was a general separation of the retina in the right eye. In the left there was also separation of the retina, but not so distinct. After consultation, it was decided to induce premature labor. This was done, and a living child was delivered. Before the completion of labor a convulsion occurred for which bleeding was resorted to. The patient convalesced and vision gradually returned. When last seen, the

disks were clearer. No separation could be made out in either eye.

Dr. B. Alexander Randall, of Philadelphia, read a paper describing a *Case of Coloboma of the Optic Nerve.*

Dr. F. Butler, of Montreal, Canada, read a paper describing *A Peculiar Form of Granular Conjunctivitis Associated with Ichthyosis.*

Two cases in which this combination was present were reported.

Adjourned.

Afternoon Session.

Dr. W. S. Dennet, of New York, exhibited an ophthalmoscope in which the lamp was substituted by an electric light behind the mirror.

Dr. Lucien Howe, of Buffalo, presented a small pocket ophthalmoscope with movable disc.

Dr. Howe also exhibited several photographs of the Interior of the Human Eye.

Dr. Edward Jackson, of Philadelphia, presented a Set of Small Test Lenses, with a Modified Trial Frame.

The lenses are one inch in diameter, and the saving in weight is from one-third to three-fourths of the weight of those in common use. The lenses are plano-convex and concave, giving advantages on the double convex and concave, by lessening spherical aberation, being easier to combine together, and making it possible to neutralize more perfectly spectacle glasses the strength of which it is desired to test. Several lenses had been added, to the series usually placed in such sets; including stronger concave sphericals; and two astigmatic lenses, which had been found very convenient in testing for astigmatism. It was suggested that all intermediate lenses added to the metric series, should be made to divide in half the present intervals of one-fourth dioptry; making the interval one-eighth and preserving the simplicity of the system.

Making the lenses smaller allows the trial frame to be made smaller, and very much lighter; so that the new frame with the new lenses weighs less than half the old frames with lenses of equal strength. The temple of the frame is attached to the lower part of the lens holder, allowing the lenses to be placed in the back groove of the holder or withdrawn therefrom through the natural depression of the temple instead of across the prominence of the brow or cheek. The set and frames are made by Queen & Co., of Philadelphia.

Dr. S. D. Risley, of Philadelphia, described an Ophthalmoscope with Cylindrical Lens.

The ophthalmoscope is of the usual form, but behind the mirror there are two slides containing the cylindrical glasses. In one slide the cylinders are +.50, 1.00, 1.50, 2.00, 2.50; in the other +.25, .30, 4.00, 5.00 and 6.00. With these numbers any desired combination can be made. The axes of the cylinders are rotated by rotating the instrument as a whole. The instrument is especially useful at the bedside for the purpose of correcting a high degree of astigmatism when present.

A Modification of the Refraction Ophthalmoscope with an Attachment for Using Cylindrical Glasses. By Swan M. Burnett, M. D., of Washington, D. C.

The modifications of the ophthalmoscope which were offered by the speaker consisted, first, in a clip behind the instrument into which the cylinders in the test case can be inserted. The inclination of the axis is read on a graduation on the back of the mirror. The author had found this arrangement satisfactory in verifying the diagnosis of astigmatism made by other methods and for examining the fundus of the astigmatic eye free from its anomalous refraction. Secondly, two supersposed discs containing lenses which singly and by combination give 47 numbers (22 plus and 25 minus lenses) with a regular interval of 0.5 D up to 10.5 plus and minus. Thirdly, a plane circular mirror with a concave tilting mirror swung in front of it. The

plane mirror does not interfere with the tilting mirror when in use and when it is desired to use the plane mirror alone the tilting mirror can be detached from its upper bearing and swung downwards out of the way on its lower bearing. The instrument is very light. It is made by Queen & Co., of Philadelphia, and its cost is about $20.00.

Transient Myopia Following Iritis. By John Green, M. D., St. Louis.

In 1867 the speaker had been the subject of iritis involving both eyes. During convalescence he noticed that the dimness of vision was not wholly due to lack of transparency of the media and that vision was improved by the use of concave glasses. He had occasionally observed in other patients with iritis that as they recovered their vision was benefited by the use of concave glasses. Last April the speaker had iritis affecting the left eye. He was then able to compare the one eye with the other, and found that the myopia induced by the iritis amounted to 1.50 D. This gradually diminished until it disappeared at the end of four weeks, leaving the normal refraction. He had been unable to find accounts of myopia as a transient symptom during convalescence from iritis.

DISCUSSION.

Dr. O. F. Wadsworth, Boston, confirmed Dr. Green's observation with reference to the occurrence of myopia during the convalescence from iritis. Patients who have had no myopia before are benefited by concave glasses. This has gradually grown weaker. He had seen this repeatedly, but it does not occur in every case.

Dr. G. C. Harlan, of Philadelphia, reported an interesting case recently under his care.

A young man, myopic 2½ D., came under observation several months ago with the history that he had spots coming before the right eye and that there had been a sudden decrease of vision. He found a certain amount of choroidal irritation

and a posterior polar opacity. This began as a six-armed cross with rectangular arms. These became more diffused during the following six weeks. During this time there had occurred a marked opacity in the anterior portion of the lens, without traumatism and with only a moderate degree of choroidal inflammation. There was no special increase in the myopia so far as the author was able to determine.

Executive Session.

The report of the Committee on Congress of American Physicians and Surgeons was received and the following resolution adopted:

Resolved, That the American Ophthalmological Society appoint a representative, and alternate, to the proposed executive committee of arrangements for the Congress of special societies, with the proviso that in making the appointment this society does not commit itself to an approval of the present sketch in all its details.

Dr. Wm. F. Norris, of Philadelphia, was elected representative to the Executive Committee of the Congress and Dr. D. B. St. John Roosa, New York, was elected alternate.

The Nominating Committee reported as follows:

Officers for ensuing year:

President—Dr. Wm. F. Norris, of Philadelphia.

Vice-President—Dr. Hasket Derby, of Boston.

Secretary-Treasurer—Dr. O. F. Wadsworth, Boston.

Corresponding Secretary—Dr. J. S. Prout, of Brooklyn.

The following were elected to membership:

Dr. Geo. Cutter, of Brooklyn.

Dr. D. C. Cocks, of New York.

Dr. H. S. Oppenheimer, New York.

Dr. Charles McIlvaine, of Trenton.

Dr. David DeBeck, of Cincinnati.

The next meeting of the association will be held at New London, Conn., on the third Wednesday of July, 1888.

CORRECTION.

The name of the author of the paper on "Photographing the Interior of the Human Eyeball," published in our last number is not, as printed, Dr. E. Barr, but Dr. Elmer Starr.